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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,798	10/06/2003	John C. Coppock	016295.1473 (DC-05419)	3696
23640	7590	11/15/2006	EXAMINER	
BAKER BOTTS, LLP 910 LOUISIANA HOUSTON, TX 77002-4995			FARROKH, HASHEM	
			ART UNIT	PAPER NUMBER
			2187	

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/679,798	COPPOCK ET AL.	
	Examiner	Art Unit	
	Hashem Farrokh	2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply.

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/8/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 06 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☐ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) ☐ Notice of Informal Patent Application (PTO-152) |
| 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) ☐ Other: _____ |

The instant application having application No. 10/679,798 has a total of 20 claims pending in the application; claims 1, 2, 4, 13, and 18 have been amended; claim 3 has been canceled; claim 21 has been added.

INFORMATION CONCERNING CLAIMS:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 and 4-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Publication No. 2002/0101711 A1 to Gold in view of U.S. Patent No. 6,834,326 B1 to Wang et al. (hereinafter Wang).

1. *In regard to claim 1, Gold teaches:*

“A method for reporting volume information on one or more redundant arrays of independent disks (RAID) (elements 302-313 in Fig. 3) in an information handling system having one or more storage device drives,” (e.g., see paragraph 98 in page 6; Fig. 10).

“the method comprising:”

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“identifying a ... RAID volume on the information handling system;” (e.g., see **paragraph 64 in page 3; Fig. 4**). *Figure 4 show that the storage device 204 consists of RAID 1 volume comprising 2 disks and RAID 5 volume comprising 10 disks.*

“correlating the RAID volume to a storage device drive;” (e.g., see **paragraph 64 in page 3; Fig. 4**). *Fig. 4 shows that the storage device 204 (shown in Fig. 1) consists of RAID 1 and RAID 5 volumes. RAID 1 correlated to disk1 and disk 2 and RAID 5 correlated to disk3 – disk12.*

“determining a worst case operational state between the identified RAID volume and the storage device drive;” (e.g., see **paragraphs 104-105 in pages 6-7; Fig. 15**). *For example a RAID volume 5 failure (e.g., a worst case operational state) cause by multiple disk drive failure (e.g., Disk3-Disk9) identified by setting the corresponding LEDs.*

“operating a chassis LED in accordance with the worst case operational state.” (e.g., see **paragraph 105 in pages 6-7**). *For example the RAID management service includes LED driver capable of setting and clearing one or more LEDs on the disk storage devices (e.g., chassis). The RAID management service (e.g., LED drive) operable to operate the LED previously detected worst-case condition (e.g., a disk failure). Gold discloses that when there is one or more disk failure (corresponding to RAID volume), a message is generated to alert (e.g., to report) this condition. The process includes setting the LEDs in the disk storage devices by the RAID management service. However, Gold does not expressly teach: “...software RAID...”*

Wang teaches: "...software RAID..." (e.g., see column 21, lines 57-58) for implementing RAID purely in software.

Disclosures by Gold and Wang are analogous because both references related to RAID Storage systems.

At the time of invention it would have been obvious to a person of ordinary skill in art to modify the RAID system taught by Gold to include the software RAID disclosed by Wang.

The motivation for using software RAID as taught by column 21, lines 63-67 to column 22 of Gold because software RAID has advantage of being more flexible as compared to hardware RAID; another advantage of using software RAID is the cost.

Therefore, it would have been obvious to combine disclosures by Wang with Gold to obtain the invention as specified in the claim.

2. *In regard to claim 2, Gold teaches:*

"determining, prior to operating the chassis LED in accordance with the worst case operational state (paragraph 105 in pages 6-7), whether a current worst case operational state is different than a last reported worst case operational state;" (e.g., see paragraph 105 in pages 6-7; Fig. 15). For example detecting or determining that the current RAID volume failure involves the current multiple disk storage device failure and then operating setting the LEDs on the storage device to alert the failure conditions.

"and reporting the current worst case operational state to the LED driver in response to a difference between the current worst case operational state and the last reported

worst case operational state.” (e.g., see paragraph 105 in pages 6-7; Fig. 15). For example when a multiple disk devices failure involving RAID 5 volume detected that is different from the previous individual disk failure, the previous message cleared and a message reported including setting the corresponding LEDs on the failed storage devices.

3. In regard to claim 4, Gold teaches:

“wherein identifying the network storage devices includes identifying one or more network attached storage appliances.” (e.g., see paragraph 51 in page 2).

4. In regard to claim 5, Gold teaches: “An information handling system, (e.g., see paragraph 51 in page 2; paragraph 52 in page 3; Figs. 1-2). All of the components of computer 100 (Fig. 1) shown in Fig. 2 are functionally coupled with the processor and one-another and represents the information handling system recited in the claim.

“comprising:”

“a processor;” (e.g., see element 202 in Fig. 2).

“a memory operably coupled to the processor;” (e.g., see element 203 in Fig. 2).

“an information storage device operably coupled to the processor and the memory;” (e.g., see element 204 in Fig. 2).

“at least one light emitting diode (LED) operably coupled to the information storage device;” (e.g., see paragraph 104 in page 6).

“and a program of instructions storable in the memory and executable by the processor (e.g., see paragraph 24 in page 1; claim 7 in page 7), the program of instructions operable to obtain an operational state for one or more software-based RAID (redundant array of independent disks) volumes on the information storage device and command operation of the LED in a manner reflective of the software-based RAID volume operational state.” (e.g., see paragraph 91 in pages 5-6; paragraph 105 in pages 6-7; Fig. 15). For example Fig. 15 shows the program steps (e.g., instructions) to detect or obtain the operational state (e.g., a volume failure). In case of failure, one or more LEDs are set to enable easy identification of disks which caused the failure. However, Gold does not expressly teach: “...software RAID...”

Wang teaches: “...software RAID...” (e.g., see column 21, lines 57-58) for implementing RAID purely in software. The motivation for combining is based on the same rationale given in the rejection of claim 1.

5. In regard to claim 6, Gold teaches:

“the program of instructions operable to communicate with a logical volume manager to determine the operating state of the one or more information handling system software-based RAID volumes” (e.g., see paragraphs 104-105 in pages 6-7; Figs. 14-15).

6. In regard to claim 7, Gold teaches:

“the program of instructions operable to communicate with an information handling system operating system to identify the information storage devices coupled to the

information handling system.” (e.g., see paragraph 63 in pages 3; paragraph 97 in pages 6; Figs. 4 and 9).

7. *In regard to claim 8, Gold teaches:*

“the program of instructions operable to determine an operational state for the one or more information storage devices.” (e.g., see paragraphs 104-105 in pages 6-7; Figs. 14-15).

8. *In regard to claim 9, Gold teaches:*

“the program of instructions operable to correlate the one or more software-based RAID volumes to the one or more information storage devices” (e.g., see paragraph 63 in pages 3; paragraph 97 in pages 6; Figs. 4 and 9).

9. *In regard to claim 10, Gold teaches:*

“the program of instructions operable to identify a least preferred operational state from the operational state of the one or more software-based RAID volumes and the one or more information storage devices.” (e.g., see paragraph 105 in pages 6-7; Fig. 15). *A least preferable state is when there are multiple storage device or disks failure, since it would cause loss of data.*

10. *In regard to claim 11, Gold teaches:*

“the program of instructions operable to operate the LED in accordance with the least preferred operational state.” (e.g., see paragraph 105 in pages 6-7; Fig. 15).

11. *In regard to claim 12, Gold teaches:*

“the program of instructions operable to: periodically poll the operational state of the software-based RAID volumes and the information storage devices;” (e.g., see **paragraph 107 in page 7**). *For example Gold teaches an automatic ongoing poll that represents the periodic poll recited in the claim.*

“determine a new least preferred operational state between the software-based RAID volume operational state and the information storage device operational state;” (e.g., see **paragraph 105 in pages 6-7; Fig. 15**).

“determine whether the new least preferred operational state is different from a previously identified least preferred operational state;” (e.g., see **paragraphs 104-105 in pages 6-7; Figs. 14-15**). *For example the new least preferred operational state include multiple disks failure (e.g., in RAID 5 volume)*

“and alter operation of the LED in response to a difference between the new least preferred operational state and the previously identified operational state.” (e.g., see **paragraph 105 in pages 6-7; Fig. 15**). *For example the previous single disk failure message is cleared and a new message generated and LEDs associated with the faulty are being set.*

12. *In regard to claim 13, Gold teaches:*

"A computer readable medium comprising a program of instructions," (e.g., see **paragraph 24**). *For example management module stored as management program. stored RAID 1 (e.g., computer readable medium) includes program instructions.*

"the program of instructions operable to:"

"determine an operating status of at least one software redundant array of independent disks (RAID) volume on an information handling system;" (e.g., see **paragraph 105 in page 6-7; Fig. 15**).

"operate at least one user observable light emitting diode (LED) operably coupled to an information storage device in a manner indicative of the software RAID volume operating status." (e.g., see **paragraph 105 in page 6-7; Fig. 15**). *However, Gold does not expressly teach: "...software RAID..."*

Wang teaches: "...software RAID..." (e.g., see column 21, lines 57-58) for implementing RAID purely in software. The motivation for combining is based on the same rational given in the rejection of claim 1.

13. *In regard to claim 14, Gold teaches:*

"the program of instructions operable to determine a last operating status and a current operating status of the at least one software RAID volume." (e.g., see **paragraph 104 in page 6; Fig. 15**).

14. *In regard to claim 15, Gold teaches:*

“the program of instructions operable to alter operation of the at least one user observable LED in response to a difference between the current operating status and the last operating status of the at least one software RAID volume.” (e.g., see paragraph 105 in pages 6-7; Fig. 15).

15. *In regard to claim 16, Gold teaches:*

“the program of instructions operable to query an information handling system volume manager to identify the at least one software RAID volume on the information handling system.” (e.g., see paragraph 97 in page 6; Fig. 9).

16. *In regard to claim 17, Gold teaches:*

“the program of instructions operable to: query an information handling system operating system to identify at least one storage device coupled to the information handling system;” (e.g., see paragraph 63 in pages 3; paragraph 97 in pages 6; Figs. 4 and 9).

“and determine an operating status for the at least one storage device.” (e.g., see paragraphs 104-105 in pages 6-7; Figs. 14-15).

17. *In regard to claim 18, Gold teaches:*

“the program of instructions operable to: identify a worst case operating status between the at least one software RAID volume and at least one storage device;” (e.g., see paragraph 105 in pages 6-7; Fig. 15).

“and operate the at least one user observable LED in accordance with the worst case operating status.” (e.g., see paragraph 105 in pages 6-7; Fig. 15).

18. *In regard to claim 19, Gold teaches:*

“the program of instructions operable to establish a correlation between the at least one software RAID volume and the at least one storage device.” (e.g., see paragraph 63 in pages 3; paragraph 97 in pages 6; Figs. 4 and 9).

19. *In regard to claim 20, Gold teaches:*

“the program of instructions operable to communicate the operating status of the at least one software RAID volume to an LED driver, the LED driver operable to command operation of the at least one user observable LED.” (e.g., see paragraph 105 in pages 6-7; Fig. 15).

20. *In regard to claim 21, Gold teaches:*

“wherein determining said worst case operational state comprises (e.g., paragraphs 91 and 94 in pages 5-6; Failures type a and 5), responsive to determining an operating state of a ... RAID volume to be nonoperational and determining an operating state of a storage device drive on which at least a portion of software RAID volume is stored to be operational, selecting the nonoperational state of the software RAID volume as the worst case operational state.” (e.g., see paragraph 102 and paragraph 104 in page 6; Fig. 14). *For example a RAID volume failure due to a card failure or RAID volume failure when failure is caused by a single device failure when RAID volume consists of*

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two or more storage devices. A portion of RAID volume on the working storage device(s) is operational. However, Gold does not expressly teach: "...software RAID..."

Wang teaches: "...software RAID..." (e.g., see column 21, lines 57-58) for implementing RAID purely in software. The motivation for combining is based on the same rational given in the rejection of claim 1.

Response to Remarks

In his Remarks the Applicant argues that cited references do not teach all limitations of claim 1. For example the page 8 of the Remarks states:

"...The cited references do not teach or suggest determining a worst case operational state between a software RAID volume and a storage device drive to which the RAID volume has been correlated and then operating a chassis LED in accordance with the worst case operational state. The Examiner indicates that Gold teaches these elements in paragraphs 89-95 and 105. Applicants respectfully disagree. Whereas Claim 1 contemplates a worst case operational state determined by the operational state of the storage device and the operational state of the corresponding RAID volume, the LEDs in Gold are operated solely on the basis of the operational state of the storage devices..."

Gold teaches that RAID volumes comprise the plurality of disk drives. For example in paragraph 64, page 3 Gold teaches:

"The RAID device can be configured into different types of RAID volume, having different levels of redundancy. In the example shown in FIG. 4, the RAID device is divided into a RAID 1 volume, and a RAID 5 volume. The RAID 1 volume comprises 2 physical disks 302, 303 whereas the RAID 5 volumes comprises the remaining 10 physical disks in the RAID device. The RAID 1 volume is assigned as a system area and the RAID 5 volume is assigned as a data storage volume and for storage of application data." (Emphasis added).

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Therefore, each RAID volume has its corresponding disk storage devices (see also Fig.

4). In fact Gold discloses a system and method to solve the RAID volume failure as related to prior art headless storage system. In paragraph 6, page 1 Gold teaches:

"Prior art headless computer entities containing RAID disk configurations require manual user configuration after the computer entity is installed and commissioned. Further, if a RAID volume fails, or a RAID card fails, then prior art headless appliances require manual reconfiguration. This involves a service call out from a manufacturer or servicing supplier." (Emphasis added).

In paragraph 72, page 4 Gold teaches:

"Handling a RAID data volume failure, and after repair of the RAID data volume, repairing a RAID configuration, but without erasing an operating system and applications which are used to perform the RAID configuration." (Emphasis added).

In paragraph 89, page 5 Gold teaches:

"The RAID management module as well as initializing the default RAID volume configuration, is also responsible for repairing any RAID volume failures, for example where two disks in a RAID volume have failed." (Emphasis added).

In paragraphs 92-93, page 6 Gold teaches:

"[0092] Failure type 2: RAID 5 volume failure--single disk failed.

[0093] Failure type 3: RAID 5 volume failure, two or more disks failed." (Emphasis added).

In paragraphs 92-93, page 6 Gold teaches:

"Referring to FIG. 14 herein, under condition of a single hard disk failure, where a single disk drive fails in either the RAID 1 or RAID 5 volumes, in step 1400 then in step 1401 an alert message is generated by the RAID management service. The alert message contains information describing which specific disk has failed, and that no data has been lost, but the computer entity is vulnerable until the failed disk is replaced. In step 1402, the RAID management service sets an LED on the failed disk to a fault condition, so that the failed disk can be easily visually identified." (Emphasis added).

In summary Gold teaches that there is a one-to-one correspondence between a RAID volume and storage devices. An operating state of RAID volume may be directly

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related to the operating state of one more storage devices. A failure or worst case condition [for example failure of one or more storage device(s)] causes the LED devices(s) to be set. Therefore, the Examiner believes Gold in combination with Wang teaches all limitations in claim 1 and other claims. As shown above Gold in view of Wang teach all limitations recited in newly added claim 21. Gold teaches 5 RAID volume failure types (see paragraphs 91-95 in pages 5-6). Failure types 1, and 4-5 are caused by a non-storage device failure. Gold also teaches that RAID failure due a single storage device failure when other storage devices in the volume are operational (e.g., a RAID volume failure when a storage device drive on which at least a portion of RAID volume is operational). Accordingly, the Examiner believes that Gold in combination with wang teach limitations as recited in the claims and therefore the Examiner maintains his position and makes this Office Action final.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication should be directed to Hashem Farrokh whose telephone number is (571) 272-4193. The examiner can normally be reached Monday-Friday from 8:00 AM to 5:00 PM.

If attempt to reach the above noted Examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Donald A Sparks, can be reached on (571) 272-4201.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either private PAIR or Public PAIR. Status information for unpublished application is available through Private PAIR only. For more information about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBS) at 866-217-9197 (toll-free).

HF
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2006-11-10

Brian R. Feugh
Brian R. Feugh
Primary Examiner
11/10/06